ABSTRACT

Systems biology models of biochemical systems have proved to be powerful conceptual tools for the analysis of biological data but have historically been arduous to formulate and test. Biological data is also unique in that it exists mostly in the differential display format, unsuitable for use in standard mathematical modeling efforts. The present invention removes the drudgery of model building and data analysis from the shoulders of the individual researchers—who are no longer able assimilate the overwhelming volume of bioinformatic data and synthesize this into a model of the underlying physiology—by providing an artificial intelligence (AI) substitute.. In addition to the use of AI methods for building the invention describes the use of difference equations and linear algebra to recast the models into another mathematical domain, allowing the direct use of differential display data formats for model testing and eliminating the need for time-consuming numerical integration. The combined effect is to significantly accelerate the model building and testing process and provide more complete alternative models for physiological and other complex systems.